Bruhath Bengaluru Mahanagara Palike

QUALITY ASSURANCE/QUALITY CONTROL REPORT

Office of the Chief Engineer (Quality Assurance/Control) Annexure-05,
BBMP Head Office, Hudson circle Bengalore-001,
Ph.no:08022975541, E-mail ID:qualitycontrol.bbmp@gmail.com

QUALITY ASSURANCE REPORT/QUALITY CONTROL REPORT

		AEE/QA/PR/09/2022-23, DATE: 07.06.23
Name of Work	:	Improvements to drains and Providing Asphalting to Roads at Havanoor Layout and Surroundings in ward no.14 Bagalagunte Estimated cost 100.00 Lakhs
Job Code	:	014-21-000010
Bill No. & Amount	:	**1st &Final Bill, Rs.92,66,113.21 (including GST)**
Name of Agency	:	**Sri Shivalingaiah Satheesh**
Type of Test Performed	:	Rebound Hammer test as per IS13311-(2)-1992 &Bitumen Content and Gradation test as per Table 500.17 MORTH V Revision.
Materials on which Tests Was Performed	:	1. RCC Drain Wall (M20) 2. Precast Cover Slab 100mm thick (M20) 3. Deck slab 250mm thick (M25) 4. Bituminous Concrete (Grade II)
Officers present during inspection	:	1.Sri. Venkateshappa AE – Ward no 14 2. Sri Jayaraju.K.S. AEE-Quality Assurance
Project Management Consultants/Third Party	:	**Civil Aim Consultants & Engineers**
Observations	:	➢ NDT (Rebound hammer test and Bitumen Content and Gradation Test was conducted by Project Management Consultants at random locations in presence of AE – Ward no 14 along with EE of QA division . ➢ The Rebound Hammer Test was conducted randomly on RCC Drain Wall (M20), Precast Cover Slab 100mm thick (M20), Deck slab 250mm thick (M25) and also The Bitumen content & Gradation Test were conducted for BC (Grade-II).The readings and results are recorded by the PMC consultants. ➢ The readings of Rebound Hammer Test and Bitumen Content & Gradation Test results are tabulated and analysis of test results done by PMC is here by furnished. ➢ The location wise test results are reproduced in the tables shown below.
Test Locations	:	Location 1: Opp. To PS Mens Gents Beauty Parlour,Ramiah Layout Location 2: Opp.No.534 Punjab Mail Resturant,Ramiah Layout Location 3: Opp.Sri Vishnu School of Nursing Near NH4 Location 4: Opp. Venkateshwara Eye Hospital, Ramiah Layout Location 5: Opp.Hitension Road (Main road Ajacent), Ramiah Layout Location 6: HT Line road,Ramaiah Layout Location 7: 6th cross Havnoor Layout Location 8: 8th cross Havnoor Layout Location 9: 1st cross Havnoor Layout Defence Colony Location 10: Opp.Sri Anna Poorneshwari Flour mill,1st cross Havnoor Layout Defence Colony

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Table-01: Bitumen Content and gradation Test Results

BC- (GRADE-II)

Location 1: Opp. To PS Mens Gents Beauty Parlour,Ramiah Layout
Location 2: Opp.No.534 Punjab Mail Resturant,Ramiah Layout
Location 3: Opp.Sri Vishnu School of Nursing Near NH4

Description	Trial 1	Trail 2	Trail 3
1.Initial weight of sample (gms) w1	508	491.5	485
2. final weight of sample after extraction (gms) w2	481.5	465.5	460
3. Initial weight of filter paper (gms) w3	2	2.1	2
4. Final weight of filter paper (gms) w4	4.1	4	4
5. Increased weight of filter paper (gms) w5=(w4-w3)	2.1	1.9	2
6. Weight of Bitumen Extracted (gms). w6=w1-w2+w5	28.6	27.9	27
7. Bitumen content in % (w6/w1)x100	5.63	5.68	5.57
8.Average	5.62		

SIEVE SIZE mm	Trail 1 Weight Retained, gm	Cumulative Weight Retained	%Cumulative Retained	% Passing	Requirement as per MORTH table 500.17
19.00	0	0	0	100	100
13.2	15.2	15.2	3.2	96.8	90-100
9.5	66.1	81.3	16.9	83.1	70-88
4.75	92.5	173.8	36.1	63.9	53-71
2.36	45.7	219.5	45.6	54.4	42-58
1.18	34.8	254.3	52.8	47.2	34-48
0.6	55.5	309.8	64.3	35.7	26-38
0.3	44.9	354.7	73.7	26.3	18-28
0.15	38.5	393.2	81.7	18.3	12-20
0.075	45.9	439.1	91.2	8.8	4-10

SIEVE SIZE mm	Trail 2 Weight Retained, gm	Cumulative Weight Retained	%Cumulative Retained	% Passing	Requirement as per MORTH table 500.17
19.00	0	0	0	100	100
13.2	17.4	17.4	3.7	96.3	90-100
9.5	63.8	81.2	17.4	82.6	70-88
4.75	92.4	173.6	37.3	62.7	53-71
2.36	45.7	219.3	47.1	52.9	42-58
1.18	35.5	254.8	54.7	45.3	34-48
0.6	58.3	313.1	67.3	32.7	26-38
0.3	45.1	358.2	76.9	23.1	18-28
0.15	36.2	394.4	84.7	15.3	12-20
0.075	45.7	440.1	94.5	5.5	4-10

SIEVE SIZE mm	Trail 3 Weight Retained, gm	Cumulative Weight Retained	%Cumulative Retained	% Passing	Requirement as per MORTH table 500.17
19.00	0	0	0	100	100
13.2	16.1	16.1	3.5	96.5	90-100
9.5	66.8	82.9	18.0	82.0	70-88
4.75	92.8	175.7	38.2	61.8	53-71
2.36	46.1	221.8	48.2	51.8	42-58
1.18	49.3	271.1	58.9	41.1	34-48
0.6	55.8	326.9	71.1	28.9	26-38
0.3	46.5	373.4	81.2	18.8	18-28
0.15	34.9	408.3	88.8	11.2	12-20
0.075	30.8	439.1	95.5	4.5	4-10

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

Table-02: Bitumen Content and gradation Test Results

BC- (GRADE-II)

Location 4: Opp. Venkateshwara Eye Hospital, Ramiah Layout
Location 5: Opp.Hitension Road (Main road Ajacent), Ramiah Layout

Description	Trial 1	Trail 2
1.Initial weight of sample (gms) w1	482	493
2. final weight of sample after extraction (gms) w2	457.5	467
3. Initial weight of filter paper (gms) w3.	2.1	2
4. Final weight of filter paper (gms) w4	4	4
5. Increased weight of filter paper (gms) w5=(w4-w3)	1.9	2
6. Weight of Bitumen Extracted (gms). w6=w1-w2+w5	26.4	28
7. Bitumen content in % (w6/w1)x100	5.48	5.68
8.Average	5.58	

SIEVE SIZE mm	Trail 1				Requirement as per MORTH table 500.17
	Weight Retained, gm	Cumulative Weight Retained	%Cumulative Retained	% Passing	
19.00	0	0	0	100	100
13.2	19.3	19.3	4.2	95.8	90-100
9.5	65.1	84.4	18.4	81.6	70-88
4.75	88.6	173	37.8	62.2	53-71
2.36	47.2	220.2	48.1	51.9	42-58
1.18	36.3	256.5	56.1	43.9	34-48
0.6	54.8	311.3	68.0	32.0	26-38
0.3	43.5	354.8	77.6	22.4	18-28
0.15	33.3	388.1	84.8	15.2	12-20
0.075	44.7	432.8	94.6	5.4	4-10

SIEVE SIZE mm	Trail 2				Requirement as per MORTH table 500.17
	Weight Retained, gm	Cumulative Weight Retained	%Cumulative Retained	% Passing	
19.00	0	0	0	100	100
13.2	20.1	20.1	4.3	95.7	90-100
9.5	64.8	84.9	18.2	81.8	70-88
4.75	92.7	177.6	38.0	62.0	53-71
2.36	46.8	224.4	48.1	51.9	42-58
1.18	35.1	259.5	55.6	44.4	34-48
0.6	54.9	314.4	67.3	32.7	26-38
0.3	42.8	357.2	76.5	23.5	18-28
0.15	33.6	390.8	83.7	16.3	12-20
0.075	42.8	433.6	92.8	7.2	4-10

Table-03: Rebound Hammer Test Results

Sl. No.	Member	Rebound Hammer Number	Average reading	Compressive Strength (N/mm2)	Impact Direction
Sample Tested Location at : HT Line road,Ramaiah Layout					
1	RCC Drain Wall (M20)	32	32	26-28	Horizontal
2		32			
3		32			
4		30			
5		34			
6		30			
Sample Tested Location at : 6th cross Havnoor Layout					
1	RCC Drain Wall (M20)	32	32	26-28	Horizontal
2		34			
3		34			
4		30			
5		32			
6		32			

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಮಟ್ಟ ನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಮಟ್ಟ ನಿಯಂತ್ರಣ ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

Sample Tested Location at : 8th cross Havnoor Layout					
1	RCC Drain Wall (M20)	30	29	22-24	Horizontal
2		30			
3		28			
4		30			
5		30			
6		28			
Sample Tested Location at : 1st cross Havnoor Layout Defence Colony					
1	RCC Drain Wall (M20)	36	32	26-28	Horizontal
2		30			
3		32			
4		30			
5		30			
6		34			
Sample Tested Location at : Opp.Sri Anna Poorneshwari Flour mill,1st cross Havnoor Layout Defence Colony					
1	RCC Drain Wall (M20)	28	31	24-26	Horizontal
2		30			
3		30			
4		32			
5		34			
6		30			

Table-04: Rebound Hammer Test Results

Sl. No.	Member	Rebound Hammer Number	Average reading	Compressive Strength (N/mm2)	Impact Direction
Sample Tested Location at : HT Line road,Ramaiah Layout					
1	Precast Cover Slab 100mm thick (M20)	24	26	22-24	Vertical Downwards
2		26			
3		24			
4		28			
5		26			
6		24			
Sample Tested Location at : 6th cross Havnoor Layout					
1	Precast Cover Slab 100mm thick (M20)	28	28	25-27	Vertical Downwards
2		26			
3		28			
4		26			
5		28			
6		30			
Sample Tested Location at : 8th cross Havnoor Layout					
1	Precast Cover Slab 100mm thick (M20)	24	26	22-24	Vertical Downwards
2		26			
3		26			
4		28			
5		24			
6		26			
Sample Tested Location at : 1st cross Havnoor Layout Defence Colony					
1	Precast Cover Slab 100mm thick (M20)	28	27	23-25	Vertical Downwards
2		30			
3		26			
4		24			
5		26			
6		28			
Sample Tested Location at : Opp.Sri Anna Poorneshwari Flour mill,1st cross Havnoor Layout Defence Colony					
1	Precast Cover Slab 100mm thick (M20)	28	27	23-25	Vertical Downwards
2		28			
3		26			
4		28			
5		26			
6		26			

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
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7/6/23
ಕಾರ್ಯ ಪಾಲಕ ಅಭಿಯಂತರರು
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ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

Table-05: Rebound Hammer Test Results

Sl. No.	Member	Rebound Hammer Number	Average reading	Compressive Strength (N/mm2)	Impact Direction
Sample Tested Location at : 1st cross Havnoor Layout Defence Colony					
1	Deck Slab 250mm thick (M25)	30	29	27-29	Vertical Downwards
2		28			
3		32			
4		28			
5		26			
6		30			
Sample Tested Location at : Opp.Sri Anna Poorneshwari Flour mill,1st cross Havnoor Layout Defence Colony					
1	Deck Slab 250mm thick (M25))	28	28	25-27	Vertical Downwards
2		28			
3		30			
4		28			
5		26			
6		28			

Conclusion:

The file containing **1st & Final bill** has been submitted for the above work to QA department on **25.05.2023** requesting for spot inspection. Engineers of QA/QC division have visited the work spot on**03.06.2023.**

PMC team was instructed to assess the strength of concrete used RCC Drain Wall (M20), Precast Cover Slab 100mm thick (M20), Deck slab 250mm thick (M25)by Rebound Hammer Test and also Gradation & Bitumen content test for BC (Grade-II) on Asphalted road . The Rebound hammer test and Bitumen Content and Gradation Tests were conducted by PMC in presence of engineer in charge of work.

From the test results furnished by PMC, it is concluded that the results of the samplescollected are in accordance with the standards/ specifications mention in the IRC codes. However, the results submitted by the PMC have been reproduced here with for further needful action. The results checked by QA/QC relates only for item tested in the particular location randomly.

Engineer in charge of work shall ensure that work executed as per this bill is not claimed in any other bill /work or else Engineer in charge of work shall be held responsible.

Further, QA/QC directs the Engineer in-charge of the work that all materials used for the work shall be inspected, tested and accepted as per the relevant specifications before incorporation in the work. The frequencies and methods of sampling and testing materials, including those required for definite purpose and not covered by MORT&H specifications shall be in accordance to the relevant IRC or BIS or AASHTO/ASTM/BS standards in order of priority.

All materials or work not conforming to the requirements of the specifications shall be considered unacceptable and rejected. The unacceptable materials or works that are rejected shall be immediately removed unless the defects are corrected and approved by the engineer in-charge of work.

The concerned Engineer in charge of the work shall follow the direction issued by Chief Commissioner Letter number dated 01.08.2022 and 14.09.2022 and take necessary action as appropriate in accordance with the law.

Note: -

This report by QA/QC is pertaining to the work carried out in **1st & Final bill** only. Therefore, further QA/QC reports shall be obtained for the items of work carried out in future Running Account bill / Final bill.

Safety precautions shall be taken at work spot to prevent any mishap, injuries or loss of life to general public and construction workers according to guidelines laid down in code of practices.

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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3/6/23

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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Engineer in charge of work shall obtain requisite approval and Implement traffic management plan prior to commencement of work.

Engineer in charge of work shall display details of work, work code, cost of project, start and completion date, and information of Engineer in charge of work with contact numbers at work spot.

Engineer in charge of work and Agency shall ensure that if any damages or defects occur pertaining to the executed work within the Defect Liability period (DLP), The same shall be rectified immediately on top priority without fail.

Engineer in charge of work shall ensure that any changes/ modification/change in location in the sanctioned estimate to be got approved by competent authority.

7-6-2023

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
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7/6/23

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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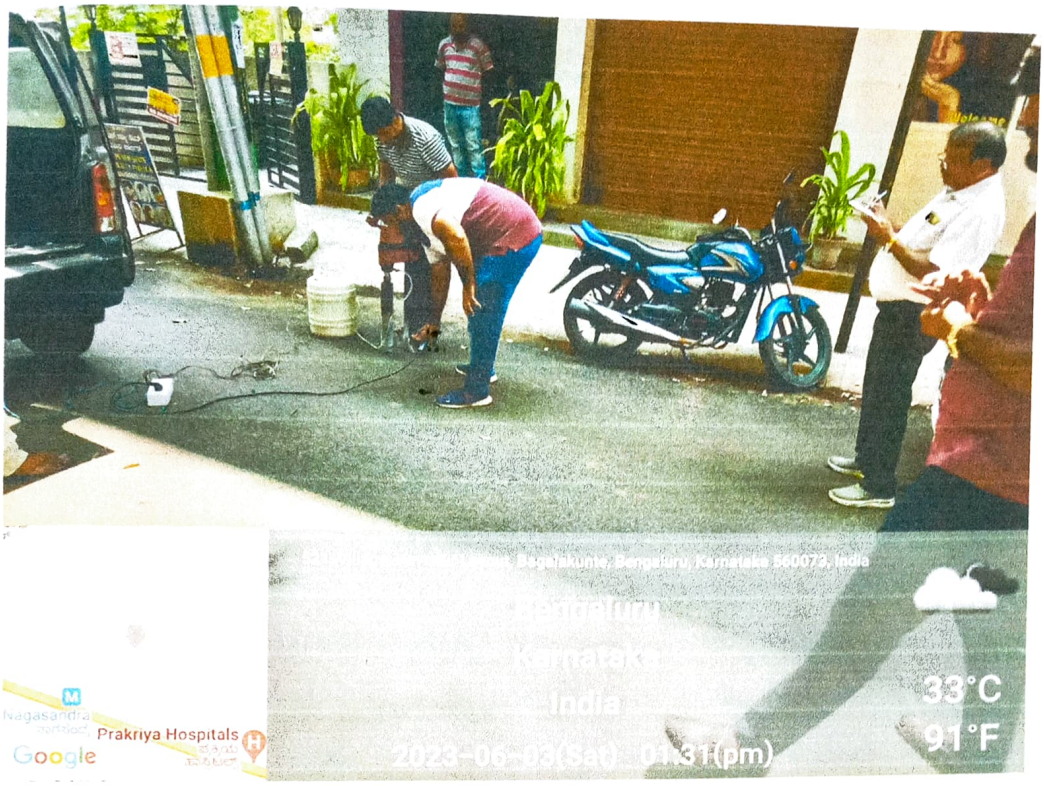
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

Location 1: Opp. To PS Mens Gents Beauty Parlour,Ramiah Layout



Location 2: Opp.No.534 Punjab Mail Resturant,Ramiah Layout

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

Location 3: Opp.Sri Vishnu School of Nursing Near NH4

Location 4: Opp. Venkateshwara Eye Hospital, Ramiah Layout

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

Location 5: Opp.Hitension Road (Main road Ajacent), Ramiah Layout

Location 6: HT Line road,Ramaiah Layout

7.6.2023

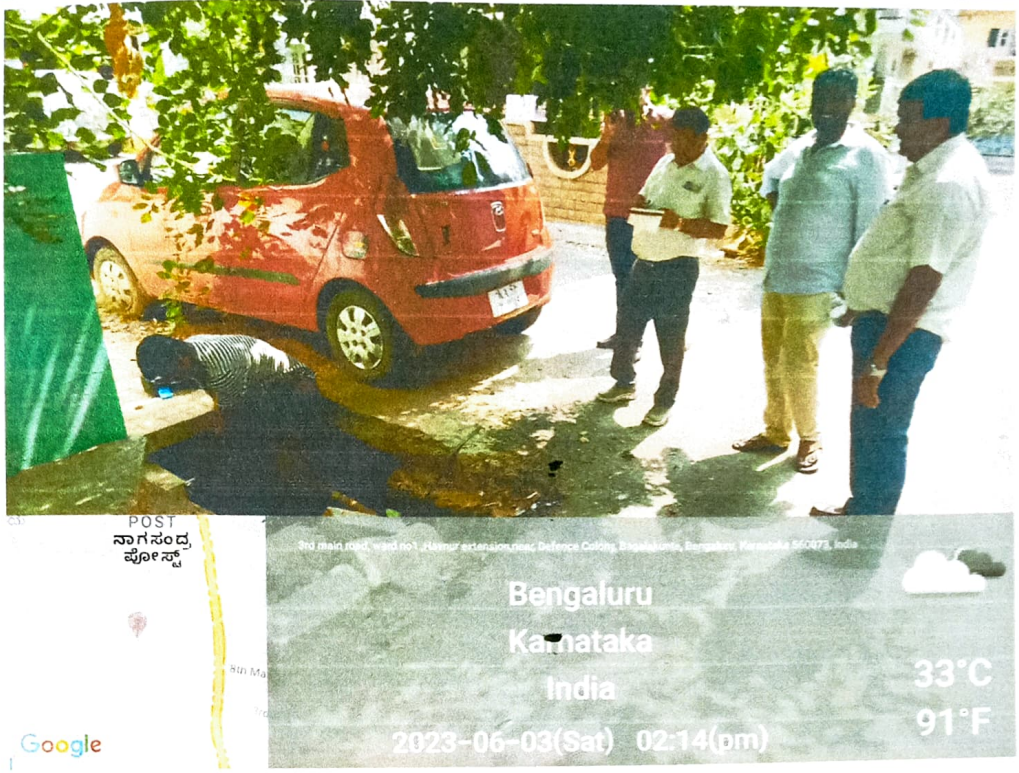
ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಕೋಶ-ಪಶ್ಚಿಮ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಕೋಶ-ಪಶ್ಚಿಮ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

Location 7: 6th cross Havnoor Layout

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ



Location 8: 8th cross Havnoor Layout

7.6.2023

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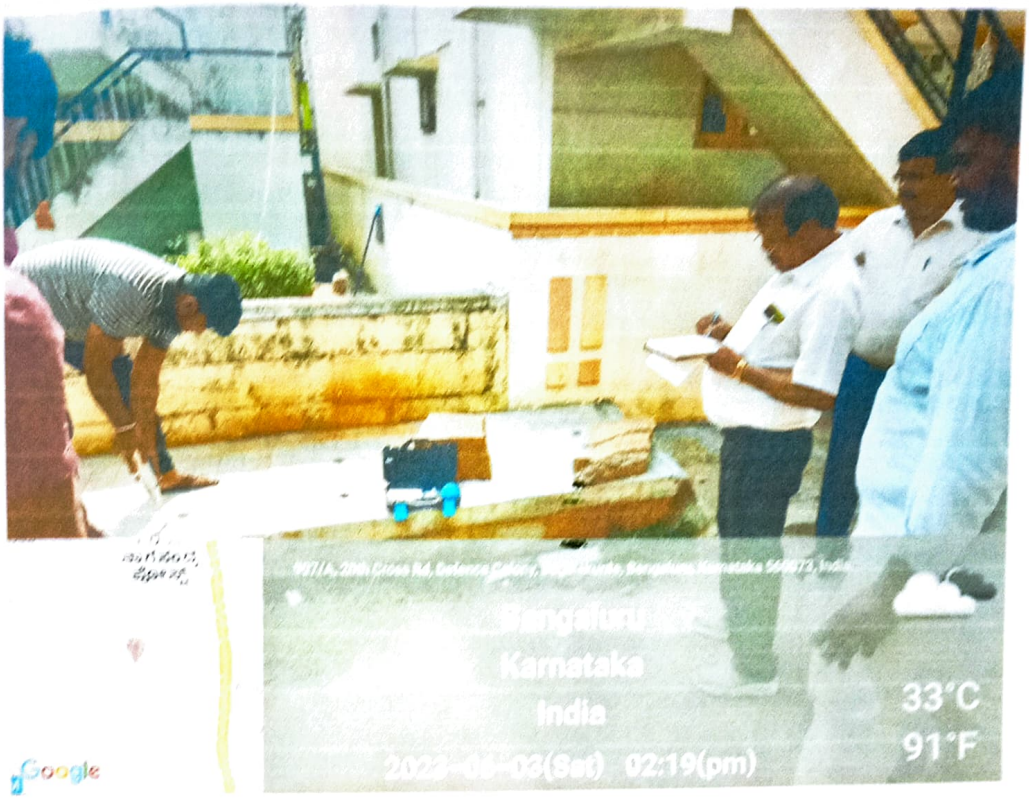
ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ



Location 9: 1st cross Havnoor Layout Defence Colony

7/6/2023

7/6/23

Improvements in drains and Providing Paver blocks at Havanoor Layout and Surroundings in Ward no.84 Bengaluru

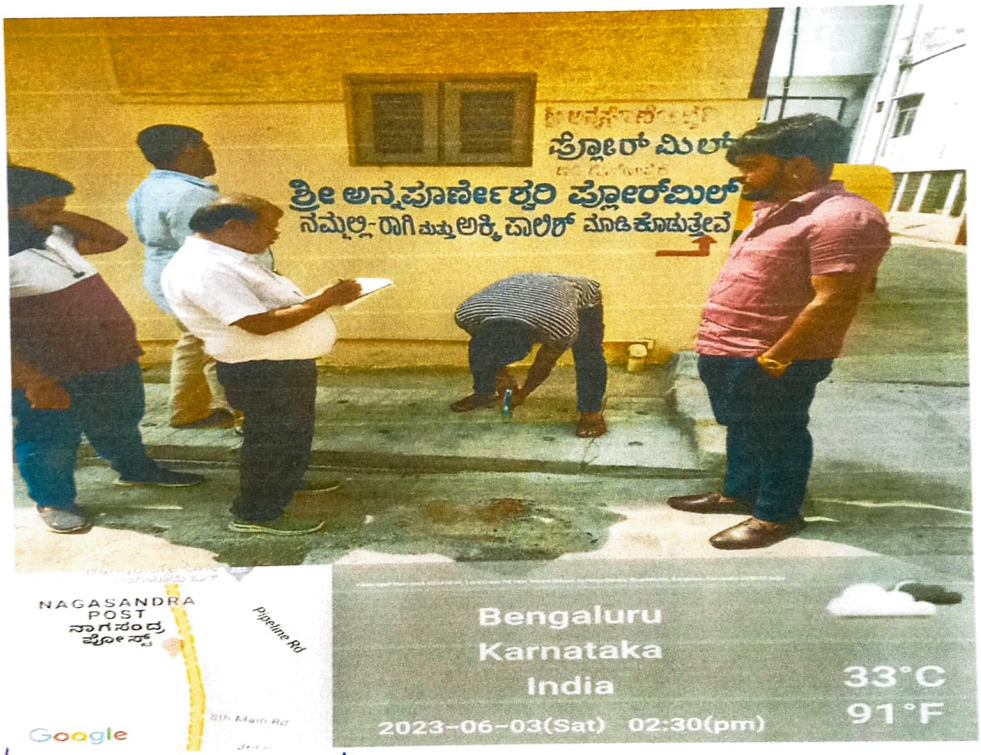
7.6.2023

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

7/6/23

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

Location 10: Opp.Sri Anna Poorneshwari Flour mill,1st cross Havnoor Layout Defence Colony

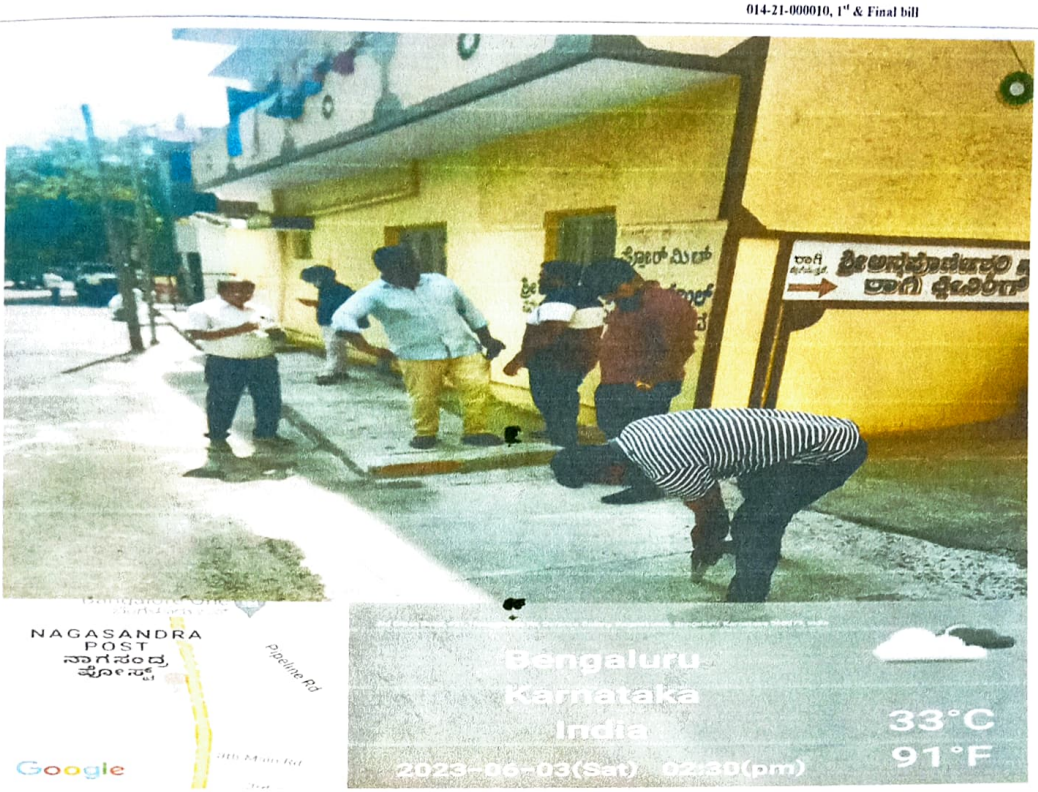


7.6.2023

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

7/6/23

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ



7.6.2023

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ಉಪ-ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

7/6/23

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಗುಣಭರವಸೆ/ಗುಣನಿಯಂತ್ರಣ ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ